

07_GRP05_All Engines.xls

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumin.	Special Prep
Catalytic Converter Monitoring	P0420	Time for Rear O2 sensor signal to go low. Catalyst monitoring performed at idle. Wait for throttle closed period, then a number of front O2 sensor oscillations to measure average fuel trim value. Then rich fueling to purge oxygen, wait for high rear O2 sensor value to indicate purged cat - or max time, then lean fueling and measure time for rear O2 sensor signal to fall. Time measurement in phase 3 begins when front O2 sensor output goes below 450 mV and stops when rear O2 sensor output goes below 450 mV	Time for rear O2 to go low. Value corrected to standard flow and catalyst temperature.	< 1400 msec	Delta load Vehicle speed Engine speed Load MAF Min time after engine start Fuel control Catalyst temperature Throttle Nr of Front O2 oscillations for averaged integrator value. Rich fuelling time Evaporative canister purge Rear O2 sensor voltage before switch to lean Lambda integrator Brake switch status changes No DTC set Battery voltage	-2 < delta load < 2 g/s < 15.5 mph 900 +200/-100 rpm 3.5 - 9 g/s > 230 s Closed loop - then rich - then lean 450 - 700 °C, modeled Closed 2 1.5 to 10 seconds Not active Time according to value in matrix, examples: 640 mV + 5 sec, 870 mV + 0 sec 0 ± 15% Max 3 Front O2 sensor Rear O2 sensor MAF sensor 11 to 18 V	13 - 30 sec, Once / DCY	Statistical treatment, up to 6 DCY, after limit is reached: immediate MIL illumination	
Synchronization error	P0340	Rationality, Sync error, high due to soot	Ignition	Not synchronized	Engine speed Revolutions	Running >500 after start phase	600 revs Once / DCY	Two DCY	
	P1340	Rationality, Sync error low	Ignition	Not synchronized	Engine speed Revolutions	Running >500 after start phase	600 revs Once / DCY	Two DCY	
Misfire Detection	P0300 to P0304	Ionization detection At idle: combination of ionization- and crankshaft speed evaluation	Misfire counter 1000 revs Misfire counter 200 revs	> 3% See separate map	Engine speed Load change transient MAP (for Man Transmission) Torque Fuel cut Battery voltage Enabling delay when Coolant temp is below -7 °C at start	> idle rpm at warm engine - 150 rpm < ± 3.0 kPa/combustion > 0 and not in disable region Not active > 10.0 V Delayed until Coolant temp > 21°C	1000 OR 200 revs, continuous Continuous	Two DCY / MIL blink	
Misfire Detected With Low Fuel	P0313	Same as above	Misfire counter 200 revolutions	See separate map	Same as above Fuel level	Same as above < 8% (5 liters)	200 revolutions Continuous	MIL blink	
Detect signals	P1312	Signal high during fuel cut OR at start OR compared to defined window	Detect signal	High	Engine speed Engine synchronization	Engine started During or after	125 revolutions Continuous	Two DCY	
	P1341 to P1344	Combustion signal cyl 1 OR 2 OR 3 OR 4 missing	Detect signal	Low	Engine speed Engine synchronization No DTC	Engine started During or after Powertrain relay rationality	45 revolutions Continuous	Two DCY	
Ion detection system error	P1315	Ion Detect Module connector disconnected	Combustion AND ignition signals	= 0 for more than 25 revs	Engine speed Fuel cut Load	Running > 400 rpm Not active > 10 mg/combustion	25 revolutions Continuous	Two DCY	
Ion detect module ignition trig input	P1350 to P1354	All or single cylinder ignition trig input to ion detect module missing	Knock signal information	= 0 at combustion stroke	Engine speed Fuel cut Load	Running > 400 rpm Not active > 10 mg/combustion	8 revolutions Continuous	Two DCY	
Knock signal	P0325	Faulty knock signal	Knock signal	No knock pulses	Accelerator pedal Engine speed Coolant temperature	Not released Engine started > 60°C	8 revolutions Continuous	Two DCY	

07_GRP05_All Engines.xls

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumin.	Special Prep
					at Vehicle speed (hot test) System power-up Purge Purge ramp Purge vapor HC content Fuel volume Fuel level Lambda control Catalyst diagnostic AIR diagnostic O2 sensor diagnostic	> 27,3 mph In present DCY, or no test in previous DCY Not active Finished, not required for cold start DCY (<40°C) Max. 50% of engine's fuel via purge 15 to 85 % Updated Closed Loop Not active Not active Not active			
						Enable Disable			
Idle test					Vehicle speed Brake activations Purge adaption Purge HC Δ vs. start Lambda integrator Δ vs. start Ambient pressure Δ Fuel tank pressure Ramp 0 vapor generation	0 Max 2 > -5% > 20% > 12,5% > 4kPa/3 min < -2100 Pa > 4 Pa/s	Once / DCY 25 sec		
Vehicle moving test					Vehicle speed Vehicle speed Δ vs. start Brake activations Purge adaption Purge HC Δ vs. start Lambda integrator Δ vs. start Ambient pressure Δ Fuel tank pressure Ramp 0 vapor generation	43,5 – 80,8 mph < ± 5 mph Max 1 > -7% > 15,5% > 10% > 4kPa/3 min < -2750 Pa > 1,1 Pa/s	Once / DCY 35 s		
Filler cap test, big leak / high vapor generation					Vehicle speed Vehicle speed Δ vs. start Brake activations Purge adaption Purge HC Δ vs. start Lambda integrator Δ vs. start Ambient pressure Δ Fuel tank pressure Ramp 0 vapor generation	31,1 – 93,2 mph > ±7,5 mph Max 1 > -24% > 30% > 25% > 5kPa/3 min < -2500 Pa > 12 Pa/s	Max 50 times /DCY		
EVAP large leak > 3 mm	P0455 P1455	Rationality check When fuel level info is incorrect	Pressure does not reach specified level in specified time. See separate document					Two DCY	
EVAP small leak 1 mm < X < 3 mm	P0442 P1442	Rationality check When fuel level info is incorrect	Pressure gradient check. See separate document	Leakage factor 4				Two DCY	
EVAP very small leak 0,5 < X < 1 mm	P0456 P1456	Rationality check When fuel level info is incorrect	Pressure gradient check. See separate document	Average leak factor > 0 (valid values -3 to 3) 13 values in stack				Up to eight DCY	

07_GRP05_All Engines.xls

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumin.	Special Prep
Fuel tank pressure sensor	P0452	Low end check	Short cut	To ground or not connected	Ignition on	>2 sec	3 sec	Two DCY	
	P0453	High end check	Short cut	To battery	Engine speed	Running	Continuous		
					Battery voltage	>11,0 V			
	P0451	Rationality	Number of flank shifts (of 25 Pa)	> 15 times in 5 sec	Ignition on	>2 sec	5 sec	Two DCY	
	P1451	When fuel level info is incorrect	Same as above	Same as above	Engine speed	Running	Once / DCY		
				Battery voltage	>11,0 V				
				ECT & IAT	> +4°C				
				Fuel in tank	< 85% (53 liters)				
				No DTC set	Fuel tank pressure sensor circuit Canister vent valve Purge valve Fuel tank pressure adaption				
				Fuel level	Updated				
Fuel tank pressure sensor	Pressure adaption, general conditions				BARO pressure	75 to 106 kPa			
					Vehicle speed	0			
					Engine speed	0			
					ECT	< +40°C			
					Fuel tank volume	< 80,5% (50 liter)			
					IAT	> 0°C			
					No DTC set	Fuel tank pressure			
				ECU	First time after Power Up				
	P1452	Sensor Offset	Min failure	Adaption value < -750 Pa	Engine speed	Running	Ignition on + 5s	Two DCY	
	P1492	Sensor offset when fuel level info is incorrect			Fuel tank pressure sensor adaption	Performed	Once / DCY		
					Fuel level	Updated			
					Battery voltage	> 11,0 V			
	P1453	Sensor Offset	Max failure	Adaption value >1000 Pa	Engine speed	Running	Ignition on + 5s	Two DCY	
	P1493	Sensor offset when fuel level info is incorrect			Fuel tank pressure sensor adaption	Performed	Once / DCY		
					Fuel level	Updated			
					Battery voltage	> 11,0 V			
EVAP Purge Valve	P0441	Valve leaking	Tank pressure drop when valve is commanded closed	> 30 Pa/sec	Vehicle speed	0	3 sec	Two DCY	
					Fuel volume	15 - 85 %	Once / DCY		
					Engine speed	Running			
					Purge	Not active			
					IAT & ECT at engine start	+4 to +40 °C			
				Battery voltage	11 to 16 Volts				
				MAP	< -15 kPa				
				No DTC set	Canister Vent Valve				
					ECT sensor				
					Vehicle Speed				
					Fuel tank pressure adaption				
					Powertrain relay				
				Depend to	Purge Valve circuit				
				ECU	First time after Power Up				
	P0444	Circuit continuity check	Short-cut	Short cut to ground or not connected	Engine speed	Running	1 sec	Two DCY	
	P0445		Short-cut	Short cut to battery voltage	Battery voltage	> 11,0 V	Continuous		
					Purge valve	Active (ECT > 40°C)			
					No DTC	Powertrain relay			
Fuel level	P0462	Min signal	AD value	< 2000	Engine speed	Running	1 sec	No MIL, will set alternate	Sets fuel volume to

07_GRP05_All Engines.xls

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumin.	Special Prep
	P0463	Max signal	AD value	> 25000	Battery voltage	> 11,0 V		DTC for EVAP rationalities	default: 64,5 % (40 liters)
	P0460	Rationality, no activity	Fuel level info change	< 1,6% (1 liter)	Engine speed Battery voltage No DTC set If the volume increases with more than 16% (10 liters) during DCY, refueling is assumed, and a new reference will be taken.	Running > 11,0 V Fuel level el. check When volume reference > 85% (53 liters) OR < 3,2% (2 liters), driving distance for evaluation is increased to 93,2 miles.	15,5 miles		
	P0461	Rationality, fuel consumption	Fuel level change	Fuel consumption less than 0,8% (0,5 liters). 5 checks done for fault setting. Results saved in buffer, also between DCY:s.	Reference volume updated when Vehicle speed Evaluation distance Evaluation distance when fuel level >90% Depend to	> 24,9 mph 21,7 miles 43,5 miles Fuel tank level el. check or rationality	5 X 21,7 miles	No MIL, will set alternate DTC for EVAP rationalities	Sets fuel volume to default: 64,5 % (40 liters)
Fuel trim, long term	P0171	System lean	Long term	<-24,6%	Engine speed	Running	1 sec	Two DCY	
	P0172	System rich	Long term	>+24,6%	Lambda control Fuel trim Coolant temperature Depend to	Active 6 updates in actual load/rpm cell (100 msec cycle time) > 71 deg C MAF Front O2 Sensor	Continuous		
Front O2 sensor	P0132	Range check high	Voltage	>1200 mV	Engine speed Battery voltage Front O2 sensor heater Closed-loop fueling	Running 11,0 < U < 18,0V Active - sensor warmed up Active	6 sec Continuous	Two DCY	
	P0131	Range check low	Voltage	< 100 mV in 30 sec	Engine speed Rear sensor signal Front O2 sensor heater Battery voltage Lambda control Load AIR EVAP leak test Fuel cut	Running > 700 mV Active - sensor warmed up > 11,0V Active > 5 sec > 0 Not active Not active Not active	30 sec Continuous	Two DCY	
	P0134	Circuit Continuity check	Voltage	300 to 600 mV	Engine speed Battery voltage Sensor heater Sensor heater active time from engine starting depending on IAT or ECT at start. EVAP leak test No DTC set Lambda control	Running > 11,0V Active <-9°C for 570 sec -8 to 8°C for 270 sec >8°C for 80 sec Not active IAT Closed loop	10 sec Continuous	Two DCY	
	P0133	Response rate	Signal switches OR Revolutions	< 4 in 140 revolutions > 110 for 4 switches	Engine speed Lambda control Battery voltage Engine load Lambda Integrator ECT Time from engine starting Purge fuel factor No DTC set	1500 – 3000 rpm Closed loop > 11,0 V 210 - 500 mg/combustion Within ±15% > 70°C > 180 sec > -10% O2 Sensor Switch Point MAF	135 revolutions Once / DCY	Two DCY	

07_GRP05_All Engines.xls

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumin.	Special Prep
O2 Sensor Switch Point	P1131	Switch point trim value	Lean	> 11,5 revolutions	Engine speed	Running	20 / 25 revolutions	Two DCY	Steady-state at 56 mph for 5 minutes
	P1132		Rich	> 11,5 revolutions	Coolant temp Delta load, positive Delta load, negative Engine speed Load Time after engine start Fuel control Rear sensor voltage for trim activation Purge adaption Stable time Additional stable time if after fuel-cut Time between adaptions No DTC set Depend to	> 70°C < 60 mg/combustion/250 msec > - 15 mg/combustion/250 msec 1500 - 2800 rpm 200 - 400 mg/combustion >200 s Closed loop > 625 mV or < 575 mV > -5% 25 sec 40 sec 10 sec MAF Rear O2 Sensor	Continuous		
Front O2 sensor heater	P0031	Range check min	Short cut	To ground or not connected	Engine speed Battery voltage O2 heater frequency	Running > 11,0 V 10 % < PWM < 85 %	6 sec Continuous	Two DCY	
		Range check max	Short cut	To battery voltage	Engine speed Battery voltage O2 heater frequency	Running > 11,0 V 10 % < PWM < 85 %	6 sec Continuous		
	P0030	Rationality	Heater current	< 300 mA for > 16 sec	Engine speed Battery voltage PWM Duty Cycle No DTC set	Running > 11,0 V 10 to 85 % Fuel pump relay	16 sec Continuous	Two DCY	
Rear O2 sensor	P0137	Signal low	Voltage	< 100 mV for > 30 sec	Engine speed Battery voltage Rear O2 sensor heater Lambda closed loop Lambda integrator Load No DTC set	Running > 11,0 V Active - sensor warmed up > 5 sec Within -20 to +20 % > 210 mg No AIR No EVAP leak test No Fuel Cut MAF	6 sec Continuous	Two DCY	
		Signal high	Voltage	>1200 mV	Engine speed Battery voltage Rear O2 sensor heater	Running > 11,0 V Active - sensor warmed up	6 sec Continuous		
	P0140	Activity	Sensor voltage	>400 mV	Engine speed Fuel cut Battery voltage Lambda control Rear O2 sensor heater	Running Active for > 6,5 sec > 11,0 V Active for > 20 sec Active - sensor warmed up	200 msec Once/DCY	Two DCY	Unified cycle demo
Rear O2 sensor heater	P0037	Range check min	Short cut	To ground or not connected	Engine speed Battery voltage Sensor heater O2 heater frequency	Running > 11,0 V Active 10 % < PWM < 85 %	6 sec Continuous	Two DCY	
		Range check max	Short cut	To battery voltage	Engine speed Battery voltage	Running > 11,0 V	6 sec Continuous		

07_GRP05_All Engines.xls

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumin.	Special Prep
					Sensor heater O2 heater frequency	Active 10 % < PWM < 85 %			
	P0036	Rationality	Heater current	< 200 mA for > 16 sec	Engine speed Battery voltage Sensor heater No DTC set	Running > 11,0 V Active Max/min fault rear O2S heater Fuel pump relay	16 sec Continuous	Two DCY	
MAP – Turbocharger Boost Pressure Correlation	P023D	Rationality MAP vs. Turbo boost sensors	Pressure difference	> 12 kPa for 3 readings	Engine speed Vehicle speed Ignition on No DTC set	0 0 Ignition off OR engine not moving OR no rpm for 3 sec preceding ignition on HW I/O Manifold Air Pressure Turbo boost pressure sensor	3 readings Once / DCY	Two DCY	
MAP sensor	P0106	Rationality	MAP	> 50 kPa for 400 msec	Engine speed Accelerator pedal Load No DTC set	Running > 1300 rpm Released for > 400 msec < 110 mg/combustion HW I/O Manifold Air Pressure Crankshaft position sensor	5 readings Once / DCY	Two DCY	
	P0107	Range check min	Short-cut	To ground or not connected	Ignition	On (Engine not moving OR engine moving OR engine running)	1 sec Continuous	Two DCY	
	P0108	Range check max	Short-cut	To sensor supply voltage	Ignition	On (Engine not moving OR engine moving OR engine running)	1 sec Continuous	Two DCY	
Turbo boost pressure sensor	P0237	Range check min	Short-cut	To ground or not connected	Ignition	On (Engine not moving OR engine moving OR engine running)	1 sec Continuous	Two DCY	
	P0238	Range check max	Short-cut	To sensor supply voltage	Ignition	On (Engine not moving OR engine moving OR engine running)	1 sec Continuous	Two DCY	
MAF sensor	P0102	Range check, low signal	Short-cut	To ground or not connected	Engine speed No DTC set	Running OR Moving Powertrain relay	Continuous	Two DCY	
	P0103	Range check, high signal	Short-cut	To sensor supply voltage	Engine speed No DTC set	Running OR Moving Powertrain relay	Continuous	Two DCY	
MAF sensor, rationality	P0101	Comparison of measured MAF sensor signal with mass air flow calculated from throttle area, BARO, MAP and Turbo Boost sensors. Samples are taken in two load windows, below and above 15 g air/sec. To report fault, the average deviation in one of the windows has to be above the limit after 500 samples. To report pass, 500 samples have to be taken in both load windows with less deviation than the fault limit.	MAF deviation AND Fuel Trim OR MAF deviation AND Fuel Trim OR MAF deviation	> -24% > -20% > 24% > 20% > ±30%	Engine speed Battery Voltage Coolant Temperature Engine Speed Pressure quote, MAP vs. pressure before throttle MAP deviation between samples Calculated Mass Air Flow (from MAP) Boost by-pass status change Vehicle speed to enable test Fuel cut BARO ECT at start Depend to	Running > 11 Volts 67 - 115 °C 1400 – 4000 rpm 0,39 - 0,70 < ±2,5 kPa in 1500 msec > 7 g/s No change for 500 ms > 18,6 mph for 60 sec Inactive > 72 kPa > -7°C MAP sensor IAT sensor Turbo boost pressure sensor	500 samples or more Continuous	Two DCY	

07_GRP05_All Engines.xls

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumin.	Special Prep
IAT sensor	P0112	Range check min	Device driver detects min error	Circuit low	Ignition	On (Engine not moving OR engine moving OR engine running)	1 sec Continuous	Two DCY	
	P0113	Range check max	Device driver detects max error	Circuit high	Ignition	On (Engine not moving OR engine moving OR engine running)	1 sec Continuous	Two DCY	
	P0111	Rationality, no activity	IAT sensor output change	< 1 °C	Soak time Run time Engine Load For time ECM reset	> 600 min > 900 sec Running > 270 mg/comb 150 sec cumulative Not allowed	900 sec Once / DCY	Two DCY	
ECT sensor	P0115	Rationality, No activity	Temp. change	< 2 °C	Engine speed Load < 150 mg/combustion AND > 270 mg/combustion ECT at start Vehicle speed No DTC set	Running 180 sec 150 sec =< 71 °C > 0 mph ECT	Load condition dependant Once / DCY	Two DCY	
Thermostat / ECT rationality	P0128	Rationality	Sample period of 200 sec starts when modeled ECT reaches 80 °C. Comparison at end of sample period: Mean value of difference between ECT reading and modeled coolant temperature	> 30 °C above modeled ECT OR > Calculated limit below modeled ECT	Engine speed ECT at start-up Calculated coolant temp Idle portion of DCY Fuel cut portion of DCY BARO ECT at start Time after start Depend to Disables for remainder of DCY if Vehicle speed Block heater start	Running < 52 °C > 80 °C < 50 % < 50 % > 72 kPa > -7°C < 750 sec ECT sensor IAT sensor Vehicle speed > 87 mph for > 30 sec (accumulated time) Not allowed	300 to 700 sec Once / DCY	Two DCY	
Low sided ECT rationality	P0126	Rationality	Sample period of 60 sec starts when modeled ECT reaches 10 °C. Comparison at end of sample period: Mean value of ECT reading is compared with threshold	ECT < 5 °C	Engine speed ECT at start-up IAT or ECT sensor Idle portion of DCY Fuel cut portion of DCY BARO Time after start Depend to Disables for remainder of DCY if Vehicle speed Block heater start	Running < 0 °C Below -7 deg C < 50 % < 50 % > 72 kPa < 800 sec ECT sensor IAT sensor Vehicle speed > 87 mph for > 30 sec (cumulative) Not allowed	150 to 300 sec Once / DCY	Two DCY	
ECT sensor	P0117	Range check min	Device driver detects min error	Circuit low	Engine speed	Not moving OR running	1 sec Continuous	Two DCY	
	P0118	Range check max	Device driver detects max error	Circuit high	Engine speed	Not moving OR running	1 sec Continuous	Two DCY	
	P0119	Too quick change	Mean value in stack (of 5 values)	> 10 °C	Engine speed	Running	5 readings, time base 100 msec	Two DCY	

07_GRP05_All Engines.xls

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumin.	Special Prep
					Comparison of each ECT reading, insert into stack when diff. from previous reading	> 5 °C	Continuous		
	P0119	Too quick change	Difference between consecutive values	> 60 °C	Engine speed Circuit continuity check	Running No fault reported during 2 sec	Continuous	Two DCY	
ECT sensor stuck above maximum enable / ECT vs. IAT comparison	P011B	Rationality	ECT vs IAT reading at engine start	ECT > 20 deg C above IAT OR IAT > 30 deg C above ECT	Engine speed Engine off time Engine run time ECT drop after 45 sec Block heater start ECM reset	Running > 600 min 45 sec < 2 deg C Not allowed Not allowed	45 sec Once / DCY	Two DCY	
Turbocharger bypass valve	P0034	Control circuit Low	Device driver detects valve error	Circuit low	Engine speed Turbo bypass valve	Running Active	Continuous	Two DCY	
	P0035	Control circuit High	Device driver detects valve error	Circuit high	Engine speed Turbo bypass valve	Running Active	Continuous	Two DCY	
	P0033	Rationality	Mean value of 50 MAF pulsations at Accelerator released AND Mean value of 50 Turbo Boost Pressure pulsations at Accelerator released	> 1.90 mg/sec > 1.1kPa	Engine speed Turbo bypass valve Turbo boost pressure BARO model BARO ECT at start No DTC set Mean value of Throttle during pulsation period	Running < 3500 rpm Commanded Open > BARO + 35 kPa Updated > 72 kPa > -7°C MAP sensor Powertrain Relay ≤ 2,6 %	600 msec, > 1 time Continuous	Two DCY	US06 demo
Turbocharger wastegate solenoid	P0245	Control circuit Low	Device driver detects min error	Circuit low	Engine speed No DTC	Running Powertrain relay rationality	Continuous	Two DCY	
	P0246	Control circuit High	Device driver detects max error	Circuit high	Engine speed	Running	Continuous	Two DCY	
	P0244	Rationality	Turbo boost pressure decrease slope AND Mean pressure diff over throttle	+ 12 to - 10 kPa/sec > 23 kPa > 30 kPa when BARO > 85 kPa	Engine speed Turbo boost pressure BARO model BARO ECT Accelerator position Max throttle change during sample period vs. start value ECT at start (out of limits) Boost adaption No DTC set Depend to	> 2200 rpm & < 5000 rpm > BARO + 39 kPa Updated > 72 kPa > 71°C 5 - 50% < 10% > -7°C Done (also in earlier DCY) Wastegate circuit Turbo boost sensor MAP	1,0 sec Continuous	Two DCY	US06 demo
		Rationality	Pressure difference over throttle	< -300 mg/comb	lika med ovanför		500 msec Continuous		US06 demo

07_GRP05_All Engines.xls

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumin.	Special Prep				
Time to closed loop	P0125	Rationality	Time before entering closed loop	> 600 sec	Engine speed Start Temperature, lowest of ECT/IAT	Running < -7°C	600 sec Once / DCY	Two DCY					
			Time before entering closed loop	>150 sec	Engine speed Start Temperature, lowest of ECT/IAT	Running -7°C < T < 10°C	300 sec Once / DCY	Two DCY					
			Time before entering closed loop	> 60 sec	Engine speed Start Temperature, lowest of ECT/IAT	Running >10°C	120 sec Once / DCY	Two DCY					
Crankshaft position sensor	P0337	Sensor circuit low	Engine speed at cranking	< 100 rpm	Cranking defined by		3,5 sec Once / DCY	Immediately					
					Battery voltage	Δ > 0,6 V							
					AND MAP vs. BARO diff	> 2 kPa							
					IF above conditions not met:	For 2 sec							
THEN Close throttle	For 1,5 sec												
MAP vs. BARO diff	> 5 kPa												
AND check engine speed													
P0339	Rationality	Lost position in same DCY	Position found then lost during 10 msec, > 7 times	Vehicle speed Engine speed Ignition	= 0 mph Cranking OR Running < 3 sec On	3 sec Continuous	Two DCY						
Lost position in same DCY	Position found then lost during 10 msec, > 3 times	Vehicle speed Brake Engine speed Ignition	> 18,6 mph Not active Running > 3 sec On	Error occurs 3 times Continuous	Two DCY								
Vehicle speed	P0501	Fault reported from ABS	Wheel Angular Velocity Front Left Validity bit AND	Not received within 1 sec	Ignition Battery voltage Nodes on HS CAN No DTC set	On for > 3 sec 6.0 V to 16.0 V Not in sleep mode OR programming mode Lost communication with ABS module (P1625)	1 sec, continuous	Two DCY					
			Wheel Angular Velocity Front Right Validity bit										
Brake light switch	P0719	Rationality - low	Vehicle speed	4 times decreases from 24,9 to 1,9 mph within 2 to 12 sec	Engine speed Brake	Running Not active	Once / DCY	Two DCY					
P0724	Rationality - high	Vehicle speed	4 times increases from 1,9 to 24,9 mph within 2 to 12 sec	Engine speed Brake	Running Active	Once / DCY	Two DCY						
Accelerator position sensor 1	P2122	Range check min	Short cut	To ground OR open circuit (< 10%)	Ignition	Off OR On	100 msec	Immediately					
					Engine speed	Moving, not moving, running, stopping	Continuous						
					P2121	Rationality check	Detected by MCP if Main processor faulty	Signal out of range (< 10%, > 93%) Min or max fault not possible to determine	Ignition	Off OR On	100 msec	Immediately	
									Engine speed	Moving, not moving, running, stopping	Continuous		
				No DTC set	Accel. pos 1 circuit								
Accelerator position sensor 2	P2127	Range check min	Short cut	To ground OR open circuit (< 5%)	Ignition	Off OR On	100 msec	Immediately					
					Engine speed	Moving, not moving, running, stopping	Continuous						
					P2126	Rationality check	Detected by MCP if Main processor faulty	Signal out of range (< 5%, > 50%) Min or max fault not possible to determine	Ignition	Off OR On	100 msec	Immediately	
									Engine speed	Moving, not moving, running, stopping	Continuous		
				No DTC set	Accel. pos 2 circuit								
Accelerator position sensors 1 & 2	P2138	Rationality check, correlation fault	Difference between 1 & 2	> 5,2%	Ignition	Off OR On	200 msec	Immediately					
			OR difference between adaptation values of 1 & 2	> 3,4% for 192 msec	Engine speed	Moving, not moving, running, stopping	Continuous						

07_GRP05_All Engines.xls

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumin.	Special Prep
Throttle position sensor 1	P0122	Range check min	Short cut	To ground OR open circuit (< 5.5%)	Ignition	Off OR On	100 msec	Immediately	
	P0123	Range check max	Short cut	To battery (> 94,5%)	Engine speed	Moving, not moving, running, stopping	Continuous		
	P0121	Rationality check	Detected by MCP if Main processor faulty	Signal out of range (< 5,5% > 94,5%) Min or max fault not possible to determine	Ignition Engine speed No DTC set	Off OR On Moving, not moving, running, stopping Throttle pos 1 circuit	100 msec Continuous	Immediately	
Throttle position sensor 2	P0222	Range check min	Short cut	To ground OR open circuit (< 5.5%)	Ignition	Off OR On	100 msec	Immediately	
	P0223	Range check max	Short cut	To battery (> 94,5%)	Engine speed	Moving, not moving, running, stopping	Continuous		
	P0221	Rationality check	Detected by MCP if Main processor faulty	Signal out of range (< 5,5% > 94,5%) Min or max fault not possible to determine	Ignition Engine speed No DTC set	Off OR On Moving, not moving, running, stopping Throttle pos 2 circuit	100 msec Continuous	Immediately	
Throttle position sensors 1 & 2	P2135	Rationality check, correlation fault	Difference between 1 & 2 OR difference between adaptation values of 1 & 2	> 4% > 4% for 192 msec	Ignition Engine speed	Off OR On Moving, not moving, running, stopping	200 msec Continuous	Immediately	
Throttle	P2176	Rationality check, throttle min pos learning fault	Throttle movement	No movement after 10 alternations	Ignition Engine speed	Off OR On Moving, not moving, running, stopping	1,5 sec Continuous	Immediately	
	P0638	Rationality check, throttle position fault	Throttle movement	In wrong direction OR Does not follow calculated movement test pattern OR > Calculated limit in Bowden cable mode	Ignition Engine speed	Off OR On Moving, not moving, running, stopping	400 msec Continuous	Immediately	
	P1523	Rationality check, throttle default position fault	Throttle position MAF Air flow	> 41% detected by Main OR Not within 27% to 41% detected by MCP OR > 23 g/s	Ignition Engine speed Throttle motor power	Off OR On Moving, not moving, running, stopping Disabled	1 sec Continuous	Immediately	
	P1681	Sensor switching fault	Transistor to pull one throttle sensor to ground does not toggle within OR TPS1 is grounded like TPS2 TPS2 is not grounded like it should be	700 msec TPS1 changes > 20% when grounding TPS? TPS2 > 25%	Engine speed Ignition	Not moving, moving, running, stopping On	700 msec Continuous	Immediately	
ECM int ROM	P0601	ROM checksum control	Checksum	Faulty for 200 msec	Ignition Engine speed	On Running, moving, not moving, stopping	200 msec Continuous	Immediately	
ECM int RAM	P0604	RAM check	RAM	Faulty for 200 msec	Ignition Engine speed	On Running, moving, not moving, stopping	200 msec Continuous	Immediately	
ECM int comm	P0606	Internal communication supervision	ECM CPU Internal serial communication	Faulty for 200 msec	Ignition Engine speed	On Running, moving, not moving, stopping	200 msec Continuous	Immediately	
ECM CPU fault	P0607	CPU control	CPU	Faulty for 200 msec	Engine speed	Ignition off, not moving, moving, running, stopping	200 msec	Immediately	
End Of Line programming fault	P0602	ECU programming supervision	CAN vehicle configuration	Unprogrammed	Ignition	On	Continuous 200 msec	Two DCY	
	P0610		Variant data	Unprogrammed					
	P0630		VIN	Unprogrammed					
	P0632		Wheel circumference	Unprogrammed					

07_GRP05_All Engines.xls

Component/ System	Fault Code	Monitor Strategy Description	Malfunction Criteria	Threshold Value	Secondary Parameters	Enable Conditions	Time Required	MIL Illumin.	Special Prep
Vref 1	P0641	Voltage supply 1 out of range	Voltage supply 1	Not within 87,75 to 92,25%	Ignition	On	100 msec	Immediately	
					Engine speed	Running, moving, not moving, stopping	Continuous		
Vref 2	P0651	Voltage supply 2 out of range	Voltage supply 2	Not within 87,75 to 92,25%	Ignition	On	100 msec	Immediately	
					Engine speed	Running, moving, not moving, stopping	Continuous		
ECM int A/D	P1680	Comparison A/D conversion of Pedal Position sensor	Main processor vs. MCP A/D conversion difference of Pedal position sensor	> 3%	Ignition Engine speed	On Running, moving, not moving, stopping	200 msec Continuous	Immediately	
TCM CAN data	P1623	Transmission controller data missing on CAN BUS	Message TCM general status	Not received within 1 sec	Ignition Battery voltage Communication Gear box Recover from a reset, over or under voltage condition	On (3 sec since power up) 6 – 18 V Normal Communication not disabled with diagnostic service (SID \$28) Automatic	1 sec Continuous	Two DCY	
TCS/ABS CAN data	P1625	TCS/ABS controller data missing on CAN BUS	Message ABS general status	Not received within 1 sec	Ignition	On for more than 3 sec	3 sec	Two DCY	
			OR message response to Wheel Angular Velocity Front Right Maintenance check	Not received within 1 sec	Battery voltage HS CAN	6 – 18 V All nodes not in sleep mode	Continuous		
Fuel pump relay	P0628	Circuit continuity check	Short-cut	To ground or not connected	Engine speed Battery voltage	Not moving OR Running > 11,0 V	1 sec Continuous	Two DCY	
	P0629		Short-cut	To battery voltage	Ignition	On			
Powertrain relay	P0686	Circuit continuity check	Short-cut	To ground or not connected	Engine speed Battery voltage	Not moving OR Running > 11,0 V	0,5 sec Continuous	Two DCY	
	P0687		Short-cut	To battery voltage	Ignition	On			
	P0685	Rationality	Powertrain relay AND BoostControl AND PurgeValve Injector 1 Injector 2 Injector 3 Injector 4 Combustion detect signals	Activated Reports low fault Reports low fault Reports low fault Reports low fault Reports low fault 0	Engine speed	Not moving OR Running	0,5 sec Continuous	Two DCY	
Idle Rpm Control	P0506		Engine idle AND Load AND Air to raise idle rpm AND all of the above during	Nominal – 100 rpm < 225 mg/comb Reached maximum 10 sec	Vehicle speed Battery voltage Accelerator pedal Throttle limp home BARO	0 > 11,0 V Released Not active > 72 kPa	10 sec Continuous	Two DCY	
	P0507		Engine idle AND Air to raise idle rpm AND all of the above during	Nominal + 200 rpm Reached minimum 10 sec	Vehicle speed Battery voltage Accelerator pedal Throttle limp home BARO	0 > 11,0 V Released Not active > 72 kPa	10 sec Continuous		
Cold start emission reduction strategy diagnostic	P1400		Timing retard or Idle speed increase	< 5 degrees < 75 rpm	Cold start strategy Load Load stable	Enabled < 380 mg/comb < 10 mg/comb/100 msec change, after this 1,5 sec before reenabement	10 sec cumulative Once / DCY	Two DCY	